
Nowcasting the poverty rate by microsimulation

*2nd MEETING OF PROVIDERS OF OECD INCOME
DISTRIBUTION DATA
Paris, OECD, 18-19 February 2016*

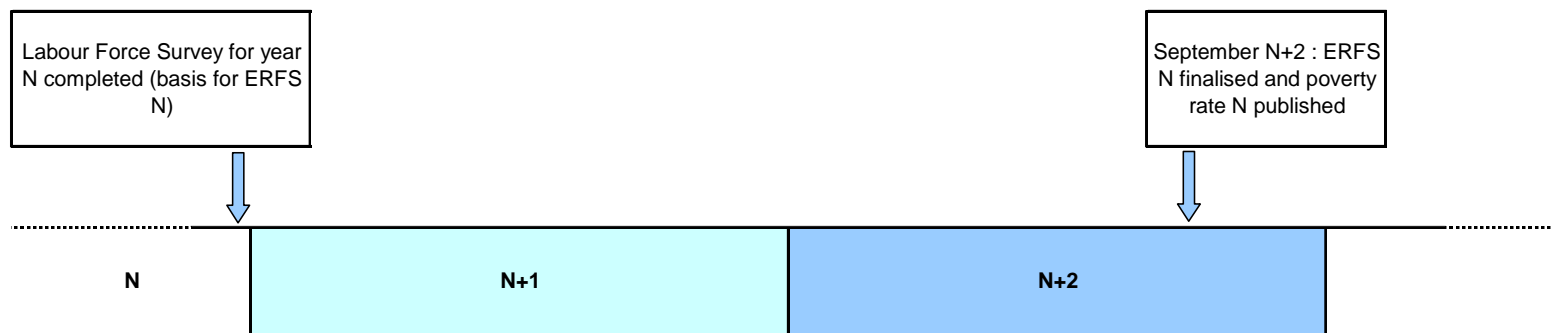
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INSEE

Summary

- 1. Introduction**
2. Method
3. Results
4. Conclusion

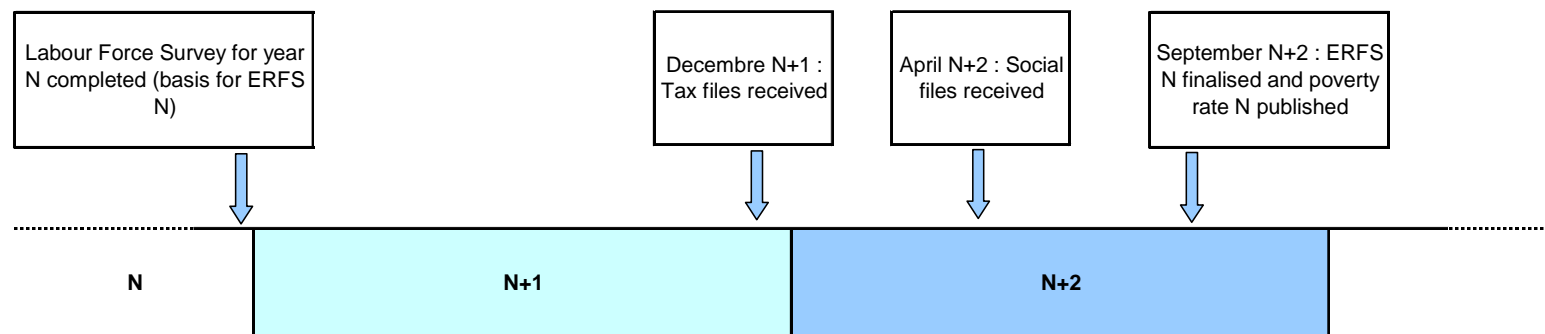
Current situation

- September **N+2**: Insee releases the final estimates of equivalised disposable income, poverty rate and the main inequality indicators, for year **N**
- Based on the Tax and Social Incomes Survey (ERFS)
 - ➔ First results are disseminated 21 months after the end of the period under consideration
- This is a long delay considering the needs of users



The Tax and Social Incomes survey (ERFS)

- ERFS results from the match between
 - The Labour Force Survey (LFS)
 - Administrative income tax and local residence tax records (source: fiscal administration)
 - Administrative data on social benefits
- Calendar for producing the ERFS explain the length of the delay
Delay mainly due to the specific features of the information system
 - $\frac{3}{4}$: collecting tax and social data
 - $\frac{1}{4}$: statistical matching + statistical processing to produce key indicators of poverty

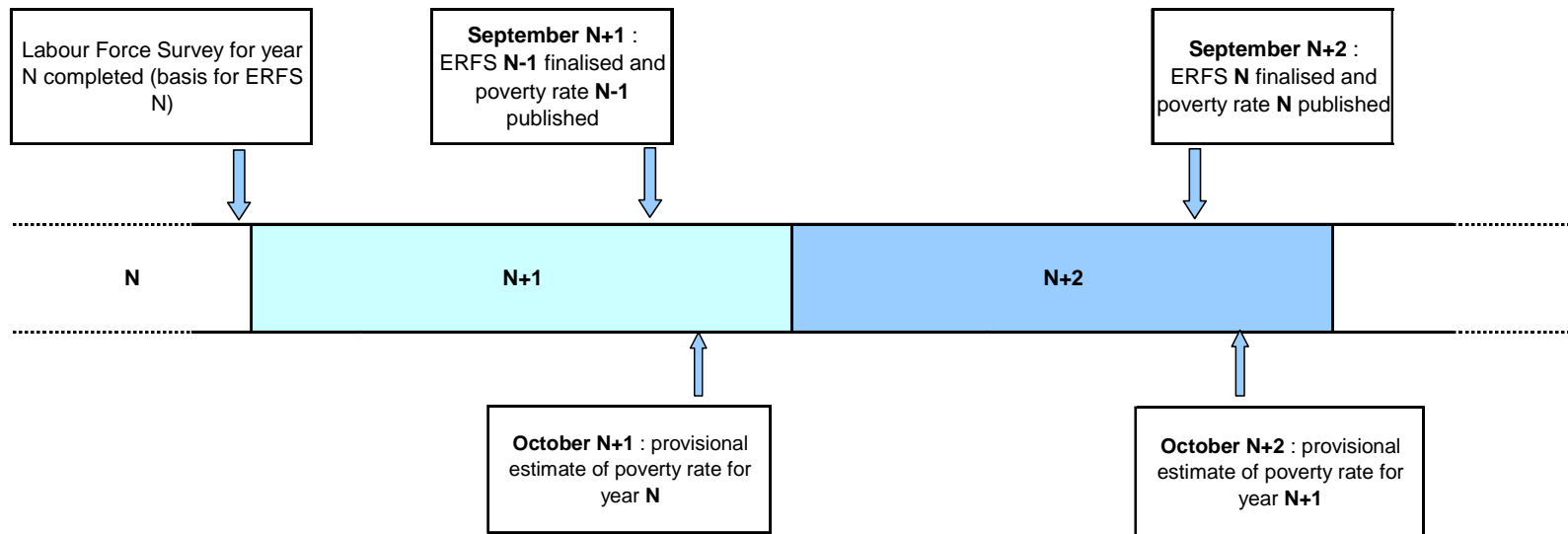


Introduction

Aim of *nowcasting* exercise: reduce by half the delay

- Future situation
 - A provisional estimate 10-11 months after the end of the period
 - A final estimate 21 months after the end of the period
- This exercise is called *nowcasting*, by analogy with the term *forecasting*, but we focus here on a period that is already past

Current situation with ERFS



Future situation with Nowcasting

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Classic use of the microsimulation model Ines

- We use microsimulation model *Ines* which simulate taxes and benefits in France
- Co-management of Ines : INSEE - DREES (Ministry of Health and Social Policy)
- Based on ERFS data set : sample of 50 000 households
- A specific feature of the French legislation which is taken into account in INES is that some taxes, benefits and contributions depend on past incomes (cf. appendix) .
 - ➔ To deal with it, we need information on 3 consecutive years of income for each individual (N-2, N-1 and N) ➔ ageing process

Main steps of model Ines

- Static ageing
 - Calibration weighting
using margins from LFS, census, etc...
 - Individual income evolution
using surveys about salaries, aggregated tax data, inflation, regulatory parameters...
 - No behavioral response
- Applying social and tax legislation
 - Gross income*
 - Income taxes
 - Social contributions
 - + Benefits
 - Family allowances
 - Social statutory minimum (RSA...)
 - Housing allowances
 - = Household's disposable income
 - Equivalised disposable income can be deduced

Diverting Ines for nowcasting

- The level of the poverty rate simulated with Ines is weaker than the “official” one
 - Calculate an evolution between $N-1$ and N
 - Report this evolution to the “official” $N-1$ poverty rate

- Importance of the sample bias relative to the database

➔ Use a single ERFS ($N-1$) to produce both evaluations for years N and $N-1$

– “Contemporary evaluation” $\widehat{\tau}_{(N-1)}^{(N-1)}$: simulating $N-1$ with ERFS $N-1$

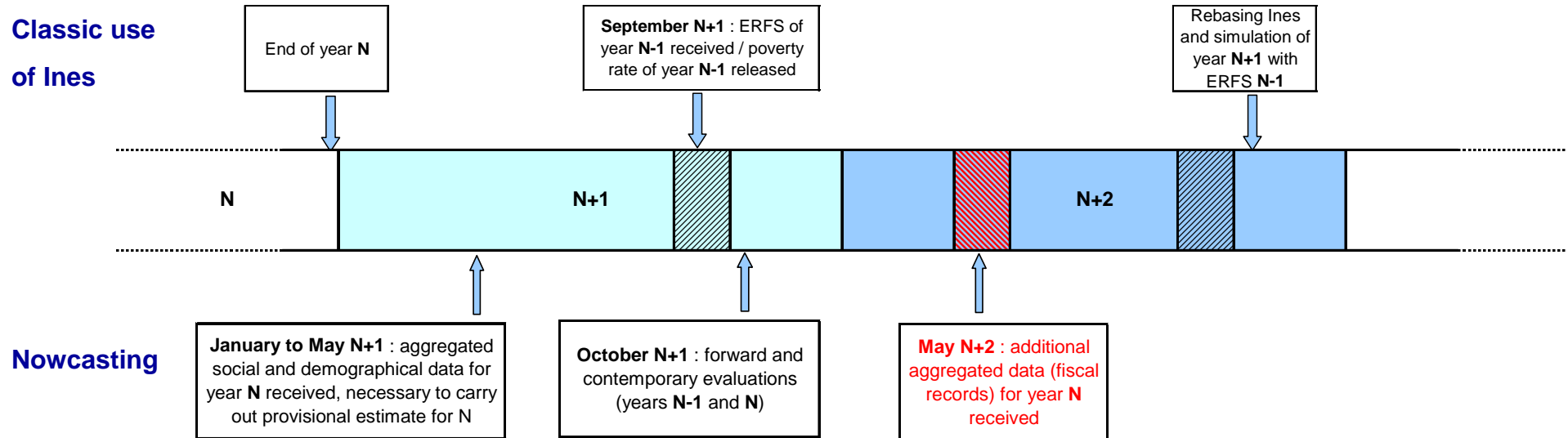
– “Forward evaluation” $\widehat{\tau}_{(N)}^{(N-1)}$: simulating N with ERFS $N-1$

➔ $\Delta \widehat{\tau}_{nowcasting} = \widehat{\tau}_{(N)}^{(N-1)} - \widehat{\tau}_{(N-1)}^{(N-1)}$

- [Consequence : “reverse ageing” to simulate the 3 consecutive years (cf. appendix)]

Method

Nowcasting: a trade-off between precision and timeliness



Trade-off principle:

- In October N+1, information relative to N-1 is available but trends evolutions will be made for ageing N-1 -> N → we are able to release a reliable provisional indicator for year N
- In May N+2 more information relative to year N will be available: would improve quality of ageing in forward evaluation and thus of the estimation

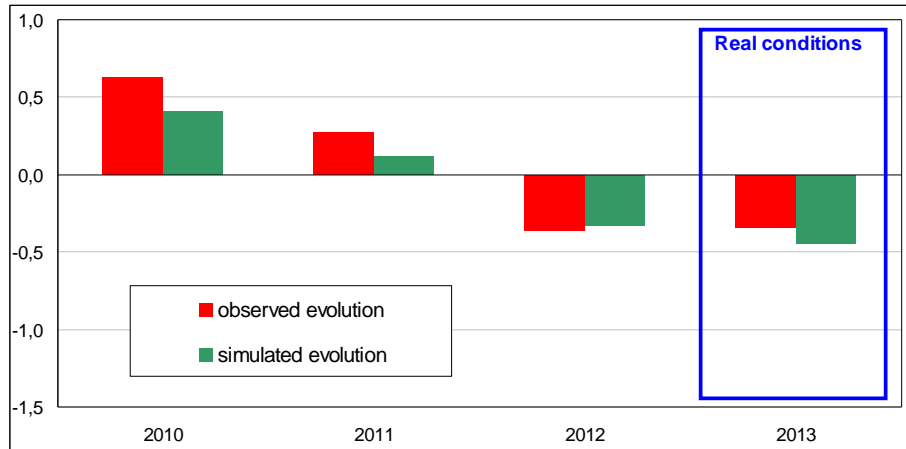
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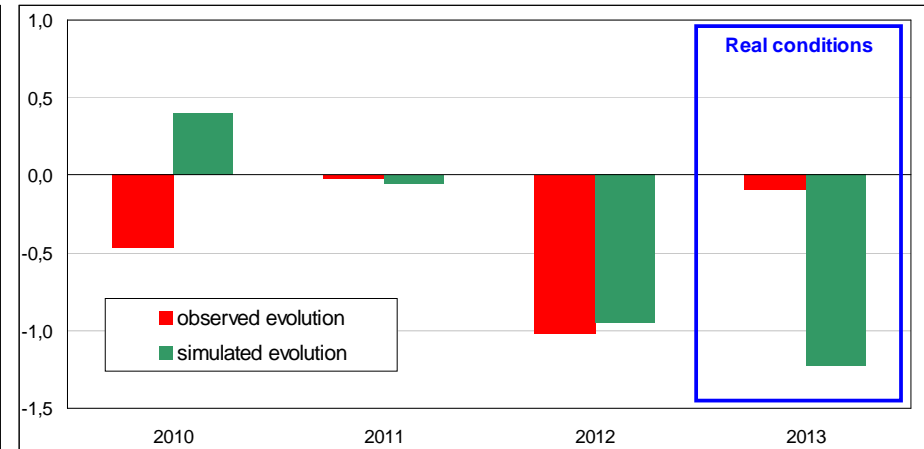
Results

2010-2013: Comparison between observed and simulated evolutions

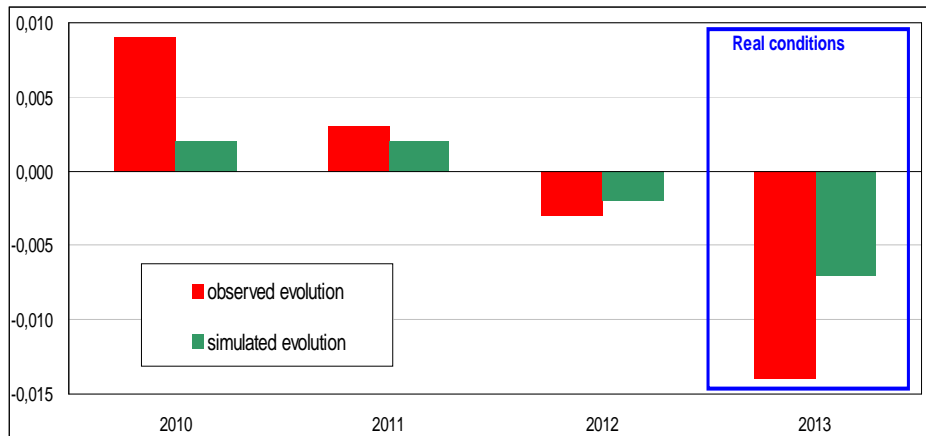
Evolution of 60% poverty rate



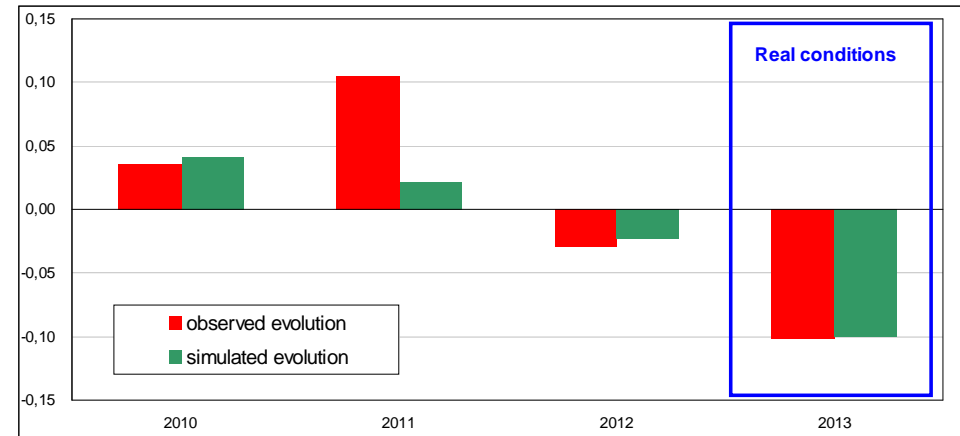
Evolution of median living standard (real growth rate, %)



Evolution of Gini index



Evolution of P90/P10 ratio



Results

2014: Recent results (poverty rate and some inequality indicators)

INSEE decided to publish experimental results for 2014 in December 2015

	2013			2014
	Simulated	Observed	Difference	Simulated
60% poverty rate				
Change between N-1 and N (points of %)	-0,4	-0,3	0,1	0,2
Level (%)	13,9	14,0	0,1	14,2
Median living standard				
Change between N-1 and N : real growth rate, %	-1,2	-0,1	1,1 (points)	-0,3
Gini index				
Change between N-1 and N	-0,007	-0,014	-0,007	0,004
Level (%)	0,298	0,291	-0,007	0,295
P90/P10				
Change between N-1 and N	-0,1	-0,1	0,0	0,0
Level (%)	3,5	3,5	0,0	3,5

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Conclusion

- Nowcasting using INES provides an estimate of the poverty rate 11 months earlier than at present.
- Between 2010 and 2013, nowcasting seems to have always predicted changes in the 60% poverty rate along the same lines as those observed one year later with ERFS. The results of the exercise are also conclusive with regards to Gini index, P90/P10, and to a lesser extent median living standard. But less satisfactory results for 50% poverty rate and poverty gap at 60%. Some results remain hard to explain.
- Estimates would especially have to be considered with caution in times of crisis or recovery, as during these times the ageing applied to an ERFS dating back one year would not necessarily be relevant in representing reality.
- Next years: nowcasting could be finalised in October or November N+1.

Nowcasting the poverty rate by microsimulation

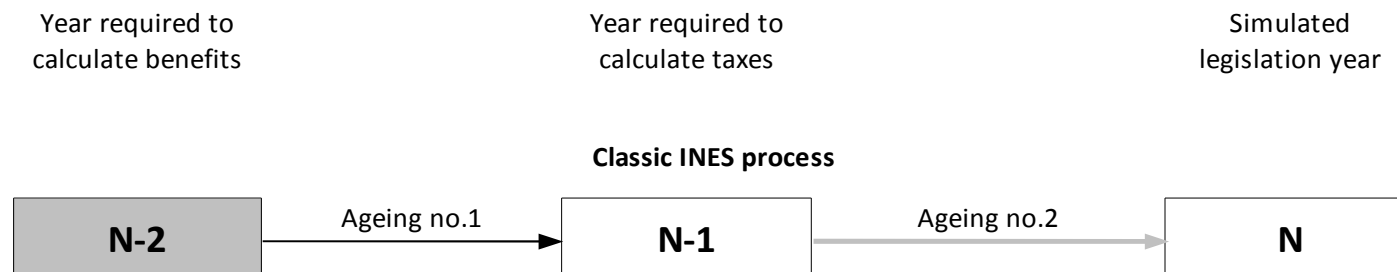
Thank you for your attention !

ANNEXE

Method

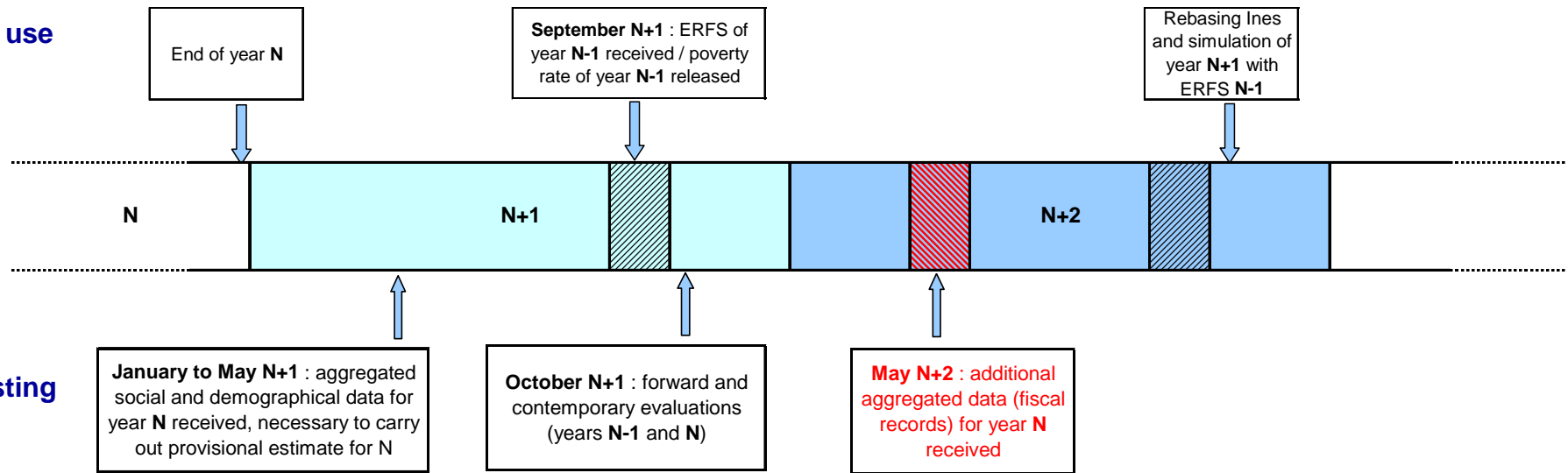
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 - Co-management of Ines : INSEE - DREES (Ministry of Health and Social Policy)
 - Based on ERFS data set : sample of 50 000 households
 - A specific feature of the French legislation which is taken into account in INES is that some taxes, benefits and contributions depend on past incomes :
 - Income tax paid in a given year (N) is calculated from the income and the situation of the previous year ($N-1$)
 - Some benefits are calculated on the basis of the income earned 2 years ago ($N-2$)
- To deal with it, we need information on 3 consecutive years of income for each individual



Nowcasting: a trade-off between precision and timeliness

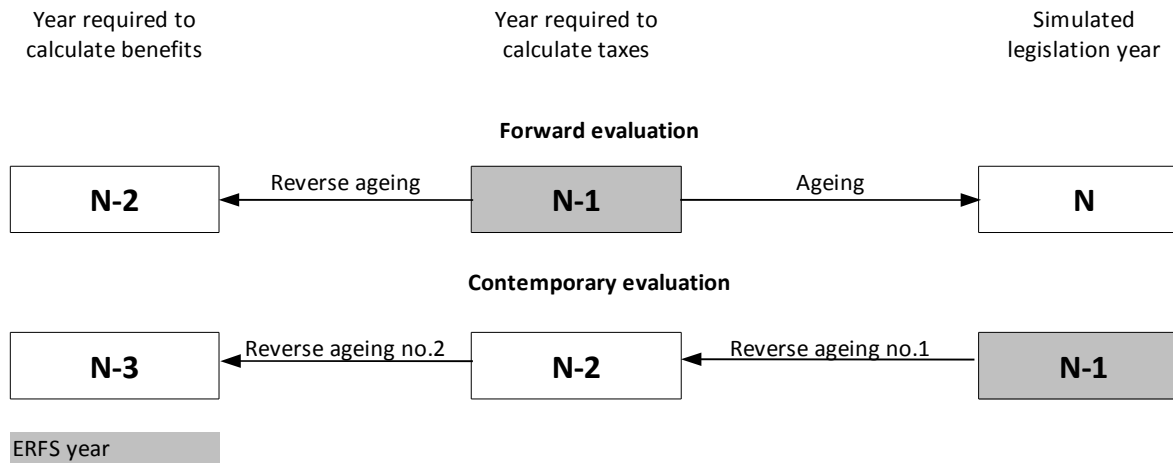
Classic use
of Ines



- Aggregated tax data for year N is not available in October N+1 but in May N+2
- Nowcasting exercise: in October N+1, information relative to N-1 is available but trends evolutions will be made for ageing N-1 -> N
- Trade-off principle: in October N+1, we are able to release a reliable provisional indicator for year N
- In May N+2 more information relative to year N will be available: would improve quality of ageing in forward evaluation

Diverting Ines for nowcasting

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- Importance of the sample bias relative to the database
 - ➔ Use a single ERFs ($N-1$) to produce both evaluations for years N and $N-1$
 - “Contemporary evaluation” : simulating $N-1$ with ERFs $N-1$
 - “Forward evaluation” : simulating N with ERFs $N-1$
- Consequence : “reverse ageing” to simulate the 3 consecutive years
 = Symetric of classic ageing ordinary implemented with Ines



Results

For 2010-2012: good results for some indicators

- Good results for 60% poverty rate (+ by age bracket and by type of household), Gini index, P90/P10 ratio, median living standart

For example for 60% poverty rate:

60 % poverty rate	ERFS	Contemporary evaluation	Forward evaluation	Nowcasting estimator	Target observed
N	(1)	(2)	(3)	$(3)_N - (2)_{N-1}$	$(1)_N - (1)_{N-1}$
2009	13,5*	12,9			
2010	14,0 (14,1*)	13,6	13,4	0,4	0,6
2011	14,3	13,9	13,8	0,1	0,3
2012	13,9		13,6	-0,3	-0,4

* Results obtained from Household Wealth survey 2004 (failing this: Household Wealth survey 2010)

- But less satisfactory results for 50% poverty rate and poverty gap at 60%

For example for 50% poverty rate:

50 % poverty rate	ERFS	Contemporary evaluation	Forward evaluation	Nowcasting estimator	Target observed
N	(1)	(2)	(3)	$(3)_N - (2)_{N-1}$	$(1)_N - (1)_{N-1}$
2009	7,5*	6,7			
2010	7,7 (7,8*)	7,0	6,9	0,2	0,4
2011	7,9	7,2	7,3	0,2	0,3
2012	8,1		7,1	-0,1	0,2

Limited impact of «real» conditions for year 2013

- For the years 2010-2012, more recent information is available when performing the exercise in 2015 than what we would have had in real conditions
 - ➔ ageing is realized using the best information available, although in real conditions, we would have made assumptions concerning trend evolutions of few incomes (movable assets, property income and extra earnings for example)
- For year 2013, we test the impact of real conditions :

	Deviation between 2012 and 2013			
	Simulated by nowcasting			observed
	Real conditions	Not real conditions	difference	
60% poverty rate (%)	-0,4	-0,4	0,0	-0,3
Median living standard (real growth rate, %)	-1,2	-0,2	1,0	-0,1
Gini index	-0,007	-0,009	-0,002	-0,014
P90/P10	-0,1	-0,1	0,0	-0,1

➔ no impact on poverty rate and P90/P10 ratio

➔ small impact on Gini index and significant impact on median living standard